AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions of claims in the application.

Listing of Claims:

1. (Original) An osteoinductive powder comprising:

(a) demineralized bone matrix (DBM) particles, and

(b) a calcium phosphate powder,

wherein said osteoinductive powder forms a formable, self-hardening, poorly crystalline apatitic (PCA) calcium phosphate paste when admixed with a physiologically acceptable liquid, wherein said paste is capable of hardening to form a PCA calcium phosphate having a compressive strength of greater than at least about 1 MPa.

2. (Original) The osteoinductive powder of claim 1, wherein said DBM particles are present in an amount in the range of about 1 to about 60 wt%.

3. (Original) The osteoinductive powder of claim 1, wherein said DBM particles are present in an amount less than about 60 wt%.

4. (Original) The osteoinductive powder of claim 3, wherein said DBM particles are present in an amount less than about 50 wt%.

5. (Original) The osteoinductive powder of claim 4, wherein said DBM particles are present in an amount less than about 20 wt%.

6. (Original) The osteoinductive powder of claim 5, wherein said DBM particles are present in an amount of about 15 wt%.

7. (Original) The osteoinductive powder of claim 1, wherein said DBM particles have a particle size of less than about 850 μm.

8. (Original) The osteoinductive powder of claim 1, wherein said DBM particles have a particle size in the range of about 125 to about 850 μm.

9. (Original) The osteoinductive powder of claim 7, wherein said DBM particles have a particle size in the range of about 53 to about 125 μm.

10. (Original) The osteoinductive powder of claim 7, wherein said DBM particles have a particle size of less than about 125 μm.

11. (Original) The osteoinductive powder of claim 1, wherein said calcium phosphate powder comprises amorphous calcium phosphate and a second calcium phosphate.

12. (Original) The osteoinductive powder of claim 11, wherein said second calcium phosphate is an acidic or a neutral calcium phosphate.

13. (Original) The osteoinductive powder of claim 12, wherein said acidic calcium phosphate is calcium metaphosphate, dicalcium phosphate dihydrate, heptacalcium phosphate, tricalcium phosphate, calcium pyrophosphate dihydrate, poorly crystalline hydroxyapatite, calcium pyrophosphate, or octacalcium phosphate.

14. (Original) The osteoinductive powder of claim 13, wherein said acidic calcium phosphate is dicalcium phosphate dihydrate (DCPD).

15. (Original) The osteoinductive powder of claim 11, wherein said amorphous calcium phosphate and said second calcium phosphate have an average crystalline domain size of less than about 100 nm.

16. (Original) The osteoinductive powder of claim 1, wherein said calcium phosphate powder is subjected to a high energy milling process prior to admixing with said DBM particles.

17. (Original) The osteoinductive powder of claim 1 further comprising at least one supplemental material selected from a cohesiveness agent, a biologically active agent, and an effervescent agent.

18. (Original) The osteoinductive powder of claim 17, wherein said cohesiveness agent is present in an amount in the range of about 1 to about 20 wt%.

19. (Original) The osteoinductive powder of claim 17, wherein said cohesiveness agent is present in an amount of less than about 20 wt%.

20. (Original) The osteoinductive powder of claim 19, wherein said cohesiveness agent is present in an amount of less than about 10 wt%.

21. (Original) The osteoinductive powder of claim 20, wherein said cohesiveness agent is present in an amount of less than about 5 wt%.

22. (Original) The osteoinductive powder of claim 21, wherein said cohesiveness agent is present in an amount of less than about 1 wt%.

23. (Original) The osteoinductive powder of claim 17, wherein said cohesiveness agent comprises a polymer selected from polysaccharides, nucleic acids, carbohydrates, proteins, polypeptides, poly(α-hydroxy acids), poly(lactones), poly(amino acids), poly(anhydrides), poly(orthoesters), poly(anhydride-co-imides), poly(orthocarbonates), poly(α-hydroxy alkanoates), poly(dioxanones), poly(phosphoesters), poly(L-lactide) (PLLA), poly(D,L-lactide) (PDLLA), polyglycolide (PGA), poly(lactide-co-glycolide (PLGA), poly(L-lactide-co-D, L-lactide), poly(D,L-lactide-co-trimethylene carbonate), polyhydroxybutyrate (PHB), poly(ε-caprolactone), poly(δ-valerolactone), poly(γ-butyrolactone), poly(caprolactone), polyacrylic acid, polycarboxylic acid, poly(allylamine hydrochloride), poly(diallyldimethylammonium chloride), poly(ethyleneimine), polypropylene fumarate, polyvinyl alcohol, polyvinylpyrrolidone, polyethylene, polymethylmethacrylate, carbon fibers, poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(ethylene oxide)-co-poly(propylene oxide) block copolymers, poly(ethylene terephthalate)polyamide, and copolymers thereof.

24. (Original) The osteoinductive powder of claim 17, wherein said cohesiveness agent is selected from alginic acid, arabic gum, guar gum, xantham gum, gelatin, chitin, chitosan, chitosan acetate, chitosan lactate, chondroitin sulfate, N,O-carboxymethyl chitosan, a dextran, fibrin glue, glycerol, hyaluronic acid, sodium hyaluronate, a cellulose, a glucosamine, a proteoglycan, a starch, lactic acid, a pluronic, sodium glycerophosphate, collagen, glycogen, a

keratin, silk, and mixtures thereof.

25. (Original) The osteoinductive powder of claim 24, wherein said cellulose is methylcellulose, carboxy methylcellulose, hydroxypropyl methylcellulose, or hydroxyethyl cellulose.

26. (Original) The osteoinductive powder of claim 24, wherein said dextran is α-cyclodextrin, β-cyclodextrin, γ-cyclodextrin, or sodium dextran sulfate.

27. (Original) The osteoinductive powder of claim 24, wherein said starch is hydroxyethyl starch or starch soluble.

28. (Original) The osteoinductive powder of claim 17, wherein said biologically active agent is selected from an antibody, an antibiotic, a polynucleotide, a polypeptide, a protein, an anti-cancer agent, a growth factor, and a vaccine.

29. (Original) The osteoinductive powder of claim 28, wherein said protein is an osteogenic protein.

30. (Original) The osteoinductive powder of claim 29, wherein said osteogenic protein is selected from BMP-2, BMP-4, BMP-5, BMP-6, BMP-7, BMP-10, BMP-12, BMP-13, and BMP-14.

31. (Original) The osteoinductive powder of claim 28, wherein said anti-cancer agent is selected from alkylating agents, platinum agents, antimetabolites, topoisomerase inhibitors, antitumor antibiotics, antimitotic agents, aromatase inhibitors, thymidylate synthase inhibitors, DNA antagonists, farnesyltransferase inhibitors, pump inhibitors, histone acetyltransferase inhibitors, metalloproteinase inhibitors, ribonucleoside reductase inhibitors, TNF alpha agonists, TNF alpha antagonists, endothelin A receptor antagonists, retinoic acid receptor agonists, immuno-modulators, hormonal agents, antihormonal agents, photodynamic agents, and tyrosine kinase inhibitors.

32. (Original) The osteoinductive powder of claim 17, wherein said effervescent agent is sodium bicarbonate, carbon dioxide, air, nitrogen, helium, oxygen, and argon.

33. (Original) The osteoinductive powder of claim 32, wherein said effervescent agent is present in an amount in the range of about 1 to about 40 wt%.

34. (Original) The osteoinductive powder of claim 1, wherein said osteoinductive

powder forms a self-setting PCA calcium phosphate paste when admixed with said physiologically acceptable liquid, wherein said paste hardens to form a PCA calcium phosphate having an overall Ca/P ratio of less than about 1.67.

35. (Original) The osteoinductive powder of claim 34, wherein said osteoinductive powder forms a self-setting PCA calcium phosphate paste when admixed with said physiologically acceptable liquid, wherein said paste hardens to form a PCA calcium phosphate having an overall Ca/P ratio of less than about 1.5 when admixed with said physiologically acceptable liquid.

36. (Original) The osteoinductive powder of claim 1, wherein said osteoinductive powder forms a self-setting PCA calcium phosphate paste when admixed with said physiologically acceptable liquid, wherein said paste hardens to form a PCA calcium phosphate having an overall Ca/P ratio in the range of about 1.0 to about 1.67 when admixed with said physiologically acceptable liquid.

37. (Original) An osteoinductive powder comprising:

(a) demineralized bone matrix (DBM) particles;

(b) a calcium phosphate powder; and

(c) a biocompatible cohesiveness agent;

wherein said osteoinductive powder forms a formable, self-hardening, poorly crystalline apatitic (PCA) calcium phosphate paste when admixed with a physiologically acceptable liquid, wherein said paste is capable of hardening to form a PCA calcium phosphate having a compressive strength of greater than at least about 1 MPa.

38. (Original) A formable, self-hardening, poorly crystalline apatitic (PCA) calcium phosphate paste suitable for use as a bone implant material comprising:

(a) a powder component comprising:

(i) demineralized bone matrix (DBM) particles,

(ii) a calcium phosphate powder; and

(b) a physiologically-acceptable fluid in an amount to produce a cohesive, formable paste, wherein said paste retains its cohesiveness when introduced at an implant site *in vivo* and hardens to form a PCA calcium phosphate having a compressive strength of greater than at least about 1 MPa.

39. (Original) The paste of claim 38, wherein said DBM particles are present in an amount in the range of about 1 to about 60 wt%.

40. (Original) The paste of claim 38, wherein said DBM particles are present in an amount less than about 60 wt%.

41. (Original) The paste of claim 40, wherein said DBM particles are present in an amount less than about 50 wt%.

42. (Original) The paste of claim 41, wherein said DBM particles are present in an amount less than about 20 wt%.

43. (Original) The paste of claim 42, wherein said DBM particles are present in an amount of about 15 wt%.

44. (Original) The paste of claim 38, wherein said DBM particles have a particle size of less than about 850 μm.

45. (Original) The paste of claim 38, wherein said DBM particles have a particle size in the range of about 125 to about 850 μm.

46. (Original) The paste of claim 38, wherein said DBM particles have a particle size in the range of about 53 to about 125 μm.

47. (Original) The paste of claim 44, wherein said DBM particles have a particle size of less than about 125 μm.

48. (Original) The paste of claim 38, wherein said calcium phosphate powder comprises amorphous calcium phosphate and a second calcium phosphate.

49. (Original) The paste of claim 48, wherein said second calcium phosphate is an acidic or a neutral calcium phosphate.

50. (Original) The paste of claim 51, wherein said acidic calcium phosphate is calcium metaphosphate, dicalcium phosphate dihydrate, heptacalcium phosphate, tricalcium phosphate, calcium pyrophosphate dihydrate, poorly crystalline hydroxyapatite, calcium pyrophosphate, or octacalcium phosphate.

51. (Original) The paste of claim 50, wherein said acidic calcium phosphate is dicalcium phosphate dihydrate (DCPD).

52. (Original) The paste of claim 48, wherein said amorphous calcium phosphate and said second calcium phosphate have an average crystalline domain size of less than about 100 nm.

53. (Original) The paste of claim 38, wherein said calcium phosphate powder is subjected to a high energy milling process prior to admixing with said DBM particles.

54. (Original) The paste of claim 38 further comprising at least one supplemental material selected from a cohesiveness agent, a biologically active agent, and an effervescent agent.

55. (Original) The paste of claim 54, wherein said cohesiveness agent is present in an amount in the range of about 1 to about 20 wt%.

56. (Original) The paste of claim 54, wherein said cohesiveness agent is present in an amount of less than about 20 wt%.

57. (Original) The paste of claim 56, wherein said cohesiveness agent is present in an amount of less than about 10 wt%.

58. (Original) The paste of claim 57, wherein said cohesiveness agent is present in an amount of less than about 5 wt%.

59. (Original) The paste of claim 58, wherein said cohesiveness agent is present in an amount of less than about 1 wt%.

60. (Original) The paste of claim 54, wherein said cohesiveness agent comprises a polymer selected from polysaccharides, nucleic acids, carbohydrates, proteins, polypeptides, poly(α-hydroxy acids), poly(lactones), poly(amino acids), poly(anhydrides), poly(orthoesters), poly(anhydride-co-imides), poly(orthocarbonates), poly(α-hydroxy alkanoates), poly(dioxanones), poly(phosphoesters), poly(L-lactide) (PLLA), poly(D,L-lactide) (PDLLA), polyglycolide (PGA), poly(lactide-co-glycolide (PLGA), poly(L-lactide-co-D, L-lactide), poly(D,L-lactide-co-trimethylene carbonate), polyhydroxybutyrate (PHB), poly(ε-caprolactone), poly(δ-valerolactone), poly(γ-butyrolactone), poly(caprolactone), polyacrylic acid, polycarboxylic acid, poly(allylamine hydrochloride), poly(diallyldimethylammonium chloride), poly(ethyleneimine), polypropylene fumarate, polyvinyl alcohol, polyvinylpyrrolidone, polyethylene, polymethylmethacrylate, carbon fibers, poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(ethylene oxide)-co-poly(propylene oxide) block copolymers, poly(ethylene terephthalate)polyamide, and copolymers thereof.

61. (Original) The paste of claim 54, wherein said cohesiveness agent is selected from alginic acid, arabic gum, guar gum, xantham gum, gelatin, chitin, chitosan, chitosan acetate,

chitosan lactate, chondroitin sulfate, N,O-carboxymethyl chitosan, a dextran, fibrin glue, glycerol, hyaluronic acid, sodium hyaluronate, a cellulose, a glucosamine, a proteoglycan, a starch, lactic acid, a pluronic, sodium glycerophosphate, collagen, glycogen, a keratin, silk, and mixtures thereof.

62. (Original) The paste of claim 61, wherein said cellulose is methylcellulose, carboxy methylcellulose, hydroxypropyl methylcellulose, or hydroxyethyl cellulose.

63. (Original) The paste of claim 61, wherein said dextran is α-cyclodextrin, β-cyclodextrin, γ-cyclodextrin, or sodium dextran sulfate.

64. (Original) The paste of claim 61, wherein said starch is hydroxyethyl starch or starch soluble.

65. (Original) The paste of claim 56, wherein said biologically active agent is selected from an antibody, an antibiotic, a polynucleotide, a polypeptide, a protein, an anti-cancer agent, a growth factor, and a vaccine.

66. (Original) The paste of claim 65 wherein said protein is an osteogenic protein.

67. (Original) The paste of claim 66, wherein said osteogenic protein is selected from BMP-2, BMP-4, BMP-5, BMP-6, BMP-7, BMP-10, BMP-12, BMP-13, and BMP-14.

68. (Original) The paste of claim 65, wherein said anti-cancer agent is selected from alkylating agents, platinum agents, antimetabolites, topoisomerase inhibitors, antitumor antibiotics, antimitotic agents, aromatase inhibitors, thymidylate synthase inhibitors, DNA antagonists, farnesyltransferase inhibitors, pump inhibitors, histone acetyltransferase inhibitors, metalloproteinase inhibitors, ribonucleoside reductase inhibitors, TNF alpha agonists, TNF alpha antagonists, endothelin A receptor antagonists, retinoic acid receptor agonists, immuno-modulators, hormonal agents, antihormonal agents, photodynamic agents, and tyrosine kinase inhibitors.

69. (Original) The paste of claim 54, wherein said effervescent agent is sodium bicarbonate, carbon dioxide, air, nitrogen, helium, oxygen, and argon.

70. (Original) The paste of claim 69, wherein said effervescent agent is present in an amount in the range of about 1 to about 40 wt%.

71. (Original) The paste of claim 38, wherein said paste self-hardens to a PCA calcium

phosphate having an overall Ca/P ratio of less than about 1.67.

72. (Original) The paste of claim 71, wherein said paste self-hardens to a PCA calcium phosphate having an overall Ca/P ratio of less than about 1.5.

73. (Original) The paste of claim 38, wherein said paste self-hardens to a PCA calcium phosphate having an overall Ca/P ratio in the range of about 1.0 to about 1.67.

74. (Original) The paste of claim 38, wherein said paste hardens to form a PCA calcium phosphate having a compressive strength in the range of about 1 MPa to about 20 MPa.

75. (Original) The paste of claim 74, wherein said paste hardens to form a PCA calcium phosphate having a compressive strength in the range of about 2 MPa to about 10 MPa.

76. (Original) The paste of claim 38, wherein said paste hardens to form a PCA calcium phosphate having a compressive strength of about 2 MPa.

77. (Original) A formable, self-hardening, poorly crystalline apatitic (PCA) calcium phosphate paste suitable for use as a bone implant material comprising:

(a) a powder component, including:

(i) demineralized bone matrix (DBM) particles,

(ii) a calcium phosphate powder, and

(iii) a biocompatible cohesiveness agent; and

(b) a physiologically acceptable fluid in an amount to produce a cohesive, formable paste, wherein said paste retains its cohesiveness when introduced at an implant site *in vivo* and hardens to form a PCA calcium phosphate having a compressive strength of greater than at least about 1 MPa.

78. (Original) A formable, self-hardening, poorly crystalline apatitic (PCA) calcium phosphate paste suitable for use as a bone implant material comprising:

(a) a powder component, including:

(i) demineralized bone matrix (DBM) particles, wherein said demineralized bone matrix particles are present in an amount between about 1 wt% and about 50 wt% of said powder component, and

(ii) a calcium phosphate powder comprised of an amorphous calcium phosphate and a second calcium phosphate source, wherein said amorphous calcium phosphate and said second calcium phosphate source have an average crystalline domain size of less than about 100nm and wherein said calcium phosphate powder is present in an amount between about 50 wt% and about 99 wt% of said powder component, and

(b) a physiologically acceptable fluid in an amount to produce a coherent, formable paste, wherein said paste retains its cohesiveness when introduced at an implant site *in vivo* and hardens to form a poorly crystalline apatitic (PCA) calcium phosphate having a compressive strength between about 1 MPa and about 20 MPa.

79. (Original) A formable, self-hardening, poorly crystalline apatitic (PCA) calcium phosphate paste suitable for use as a bone implant material comprising:

(a) a powder component, including:

(i) demineralized bone matrix (DBM) particles, wherein said demineralized bone matrix particles are present in an amount between about 1 wt% and about 50 wt% of said powder component,

(ii) a calcium phosphate powder comprised of an amorphous calcium phosphate and a second calcium phosphate source, wherein said amorphous calcium phosphate and said second calcium phosphate source have an average crystalline domain size of less than about 100nm and wherein said calcium phosphate powder is present in an amount between about 50 wt% and about 99 wt% of said powder component, and

(iii) a biocompatible cohesiveness agent, wherein said cohesiveness agent is present in an amount between about 1 wt% and about 20 wt% of said powder component; and

(b) a physiologically-acceptable fluid in an amount to produce a coherent, formable paste, wherein said paste retains its cohesiveness when introduced at an implant site *in vivo* and hardens

to form a poorly crystalline apatitic (PCA) calcium phosphate having a compressive strength between 1 MPa and 20 MPa.

80. (Original) A bone implant material comprising a poorly crystalline apatitic (PCA) calcium phosphate, wherein said PCA calcium phosphate is formed by combining:

(a) a powder component, including:

(i) demineralized bone matrix (DBM) particles,

(ii) a calcium phosphate powder comprised of an amorphous calcium phosphate and a second calcium phosphate source, wherein said second calcium phosphate source is an acidic calcium phosphate, and

(iii) a biocompatible cohesiveness agent; and

(b) a physiologically-acceptable fluid,

wherein said powder component and said liquid combine to produce a paste that hardens to form a PCA calcium phosphate having a compressive strength between about 1 MPa and about 20 MPa.

81. (Cancelled)

82. (Original) A method of bone repair comprising providing a bone implant material

comprising a poorly crystalline apatitic (PCA) calcium phosphate, wherein said PCA calcium phosphate is formed by combining:

(a) a powder component, including:

(i) demineralized bone matrix (DBM) particles,

(ii) a calcium phosphate powder comprised of an amorphous calcium phosphate and a second calcium phosphate source, wherein said second calcium phosphate source is an acidic calcium phosphate, and

(iii) a biocompatible cohesiveness agent; and

(b) a physiologically-acceptable fluid,

wherein said powder component and said liquid combine to produce a paste that hardens to form a PCA calcium phosphate having a compressive strength between about 1 MPa and about 20 MPa.

83. (Original) A method of assaying the amount of demineralized bone matrix (DBM) particles, by weight, in a sample comprising DBM particles and a calcium phosphate powder, wherein the method comprises:

(a) adding hydrogen chloride to the sample;

(b) agitating the sample;

(c) obtaining a pellet of extracted DBM particles;

(d) drying the extracted pellet of DBM particles; and

(e) weighing the extracted DBM particles.